

### BRIEF DESCRIPTION OF THE DRAWING

[0011] A fuller understanding of the present invention and the features and benefits thereof will be accomplished upon review of the following detailed description together with the accompanying drawings, in which:

[0012] FIG. 1 shows a layered article including a single crystal silicon substrate, a thin silicon oxynitride layer ( $\text{Si}_x\text{N}_y\text{O}_z$ ) disposed on the silicon substrate, and a single crystal Group III-N layer, according to an embodiment of the invention.

[0013] FIG. 2 is an equilibrium phase-diagram for the Ga-N-O-Si system.

[0014] FIGs. 3(a) and <sup>3</sup>(b) are ESCA spectra for silicon annealed at 900°C in 1 slm of  $\text{N}_2$  with 100 %  $\text{NH}_3$  at 1 slm and without  $\text{NH}_3$ , respectively.

[0015] FIGs. 4(a) and <sup>4</sup>(b) are ESCA spectra of the Si  $2p_3$  peak for silicon annealed at 900°C in 1 slm of  $\text{N}_2$  with 100 %  $\text{NH}_3$  at 1 slm and without  $\text{NH}_3$ , respectively.

[0016] FIGs. 5(a) and <sup>5</sup>(b) are ESCA spectra of Si  $2p_3$  peak for silicon annealed at 560°C in 1 slm of  $\text{N}_2$  with 100 %  $\text{NH}_3$  at 1 slm and without  $\text{NH}_3$ , respectively.

[0017] FIG. 6 is a low resolution XRD spectra for GaN on Si (111).

- [0018] FIG. 7 is a high resolution XRD spectrum for GaN grown on Si (111).
- [0019] FIG. 8. is an AFM of GaN grown on (111) Si.
- [0020] FIG. 9 is a room temperature photoluminescence (PL) spectrum of GaN grown on Si(111) at 560°C.
- [0021] FIG. 10 shows a SEM of low-temperature MOCVD/HVPE GaN showing a silicon oxynitride layer.
- [0022] FIGs. 11(a) and (b) show high resolution TEM images showing about a 2 nm oxynitride layer formed at the substrate/film interface for GaN on Si(111) for 560°C MOVPE followed by 560°C HVPE.
- [0023] FIGs. 12(a)-(c) show high resolution TEM images showing an oxynitride layer formed at the substrate/film interface for GaN on Si(111) for 900°C MOVPE.
- [0024] FIG. 13 is SIMS depth profile data indicating the formation of a silicon oxynitride layer at the GaN/Si interface for GaN grown on Si(111) at T = 850°C.